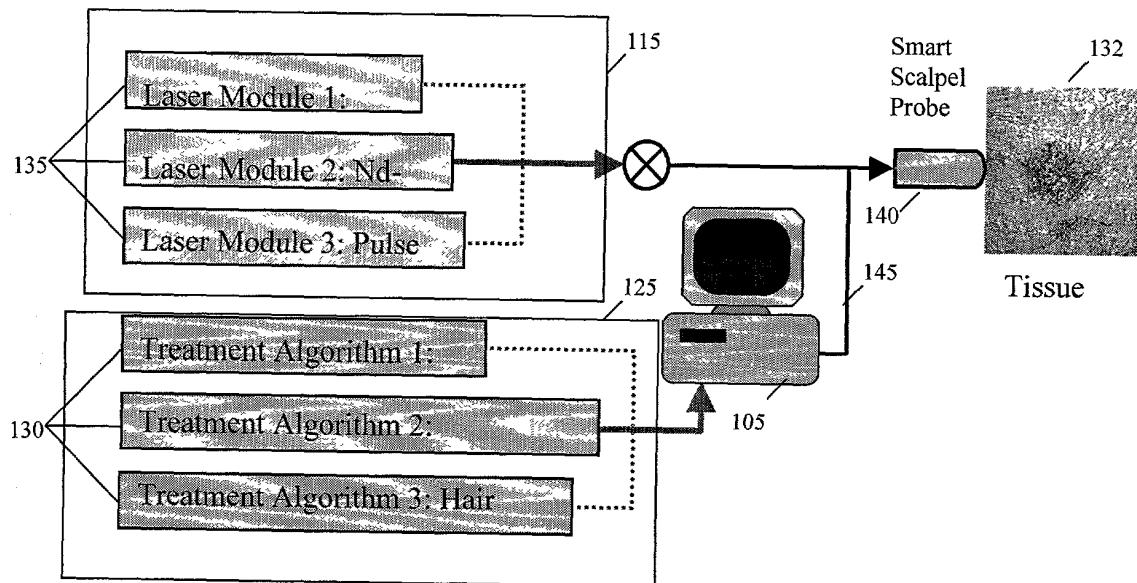


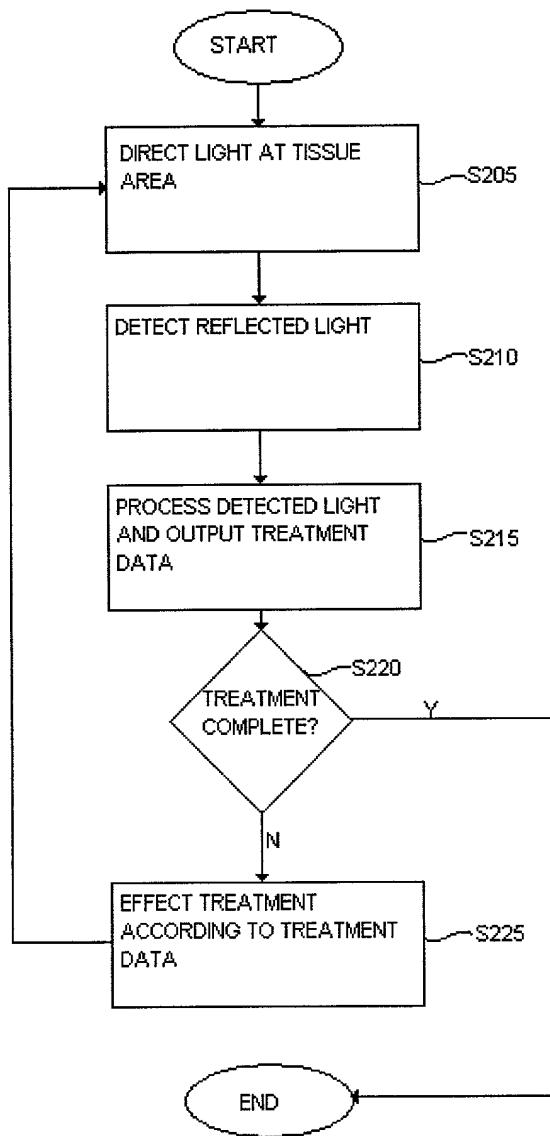
100

**FIG. 1A**



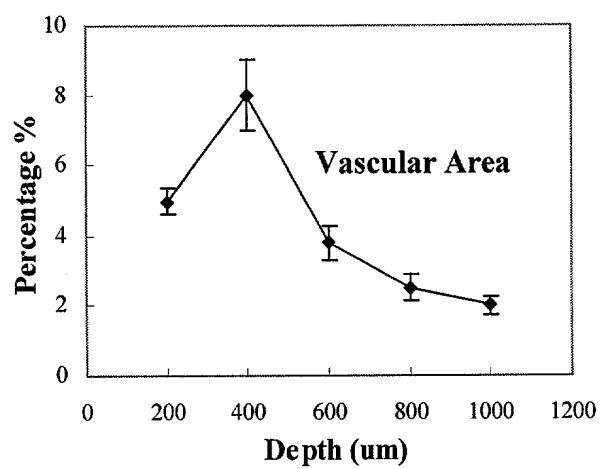
100

**FIG. 1B**

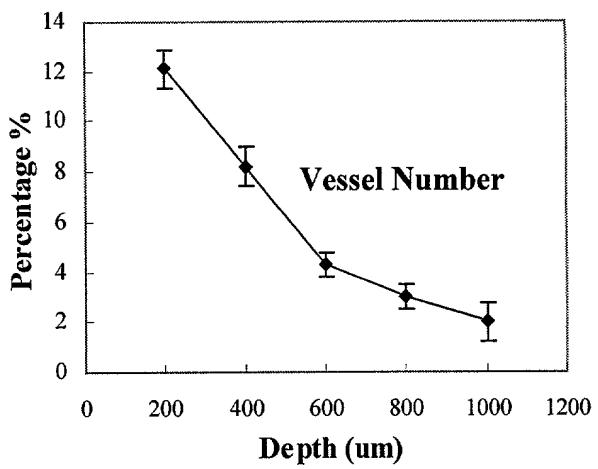


200

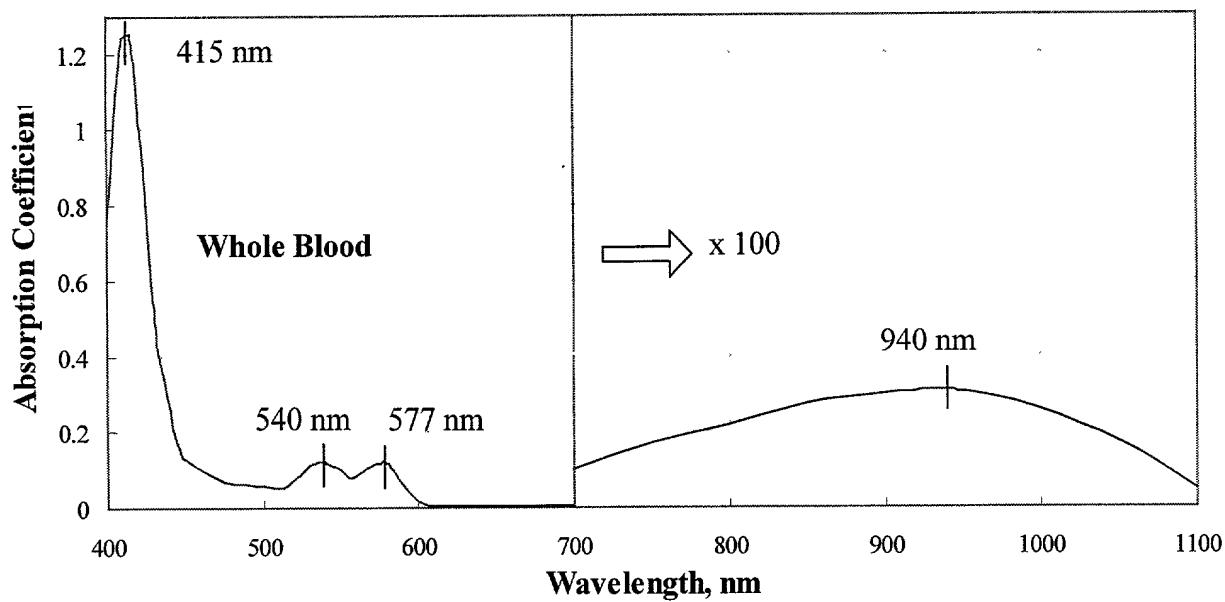
FIG. 2



**FIG. 3A**



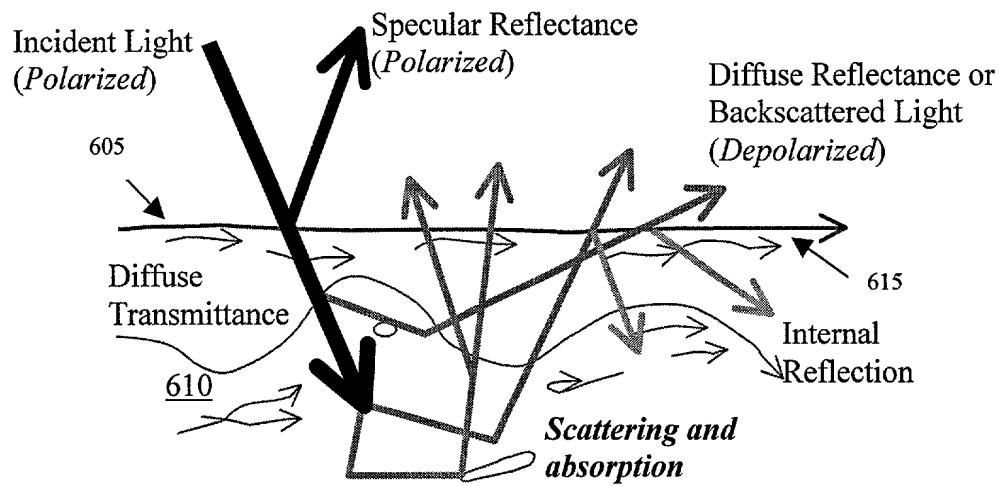
**FIG. 3B**



**FIG. 4**

Laser	Wavelength (nm)	Treat Fluence (J/cm <sup>2</sup> )	Type
Argon	488, 514	1-10	CW
Classic KTP	532	10-40	CW
Cu or Cu-Br	512-578	1-10	CW
Krypton	570	1-10	CW
Pulse dye (yellow)	585	4-8	Pulsed
Derm-KTP	532	2-20	Pulsed
Pulsed dye (green)	510	3-5	Pulsed
Q-sw. Nd:YAG – green - infrared	532 1064	3-5 4-10	Pulsed
Q-sw. Ruby (red)	694	4-10	Pulsed
Q-sw. Alexandrite (infrared)	755	4-10	Pulsed

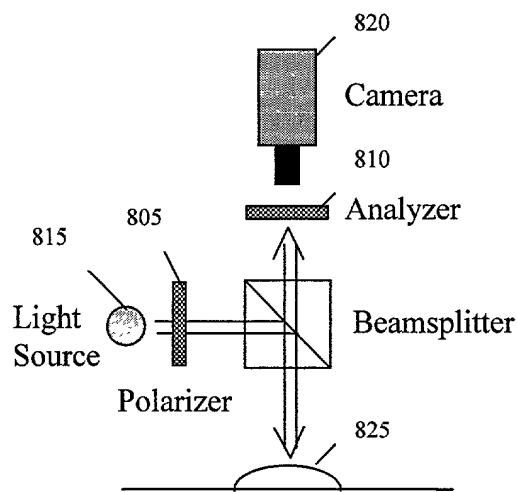
**FIG. 5**



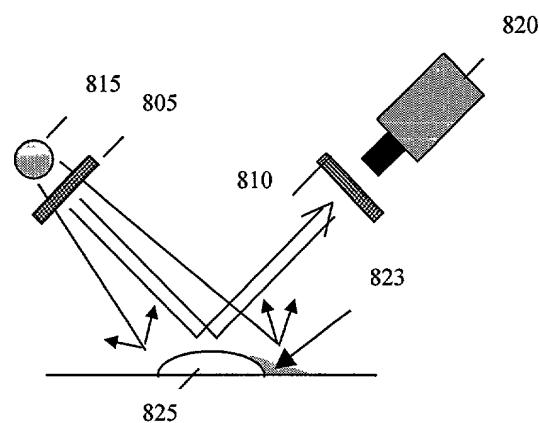
**FIG. 6**

Tissue	$\lambda$ (nm)	$\mu_a$ ( $\text{mm}^{-1}$ )	$\mu_s$ ( $\text{mm}^{-1}$ )	$G$	$\mu_s'$ ( $\text{mm}^{-1}$ )	$\mu_t$ ( $\text{mm}^{-1}$ )
Human dermis	633	0.27	18.7	0.81	3.553	3.823

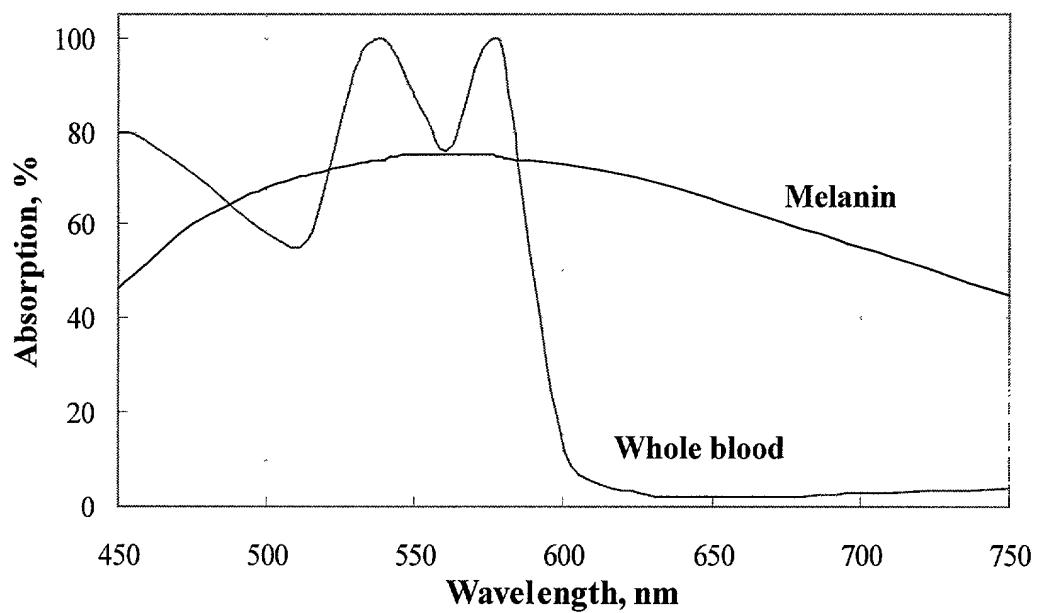
**FIG. 7**



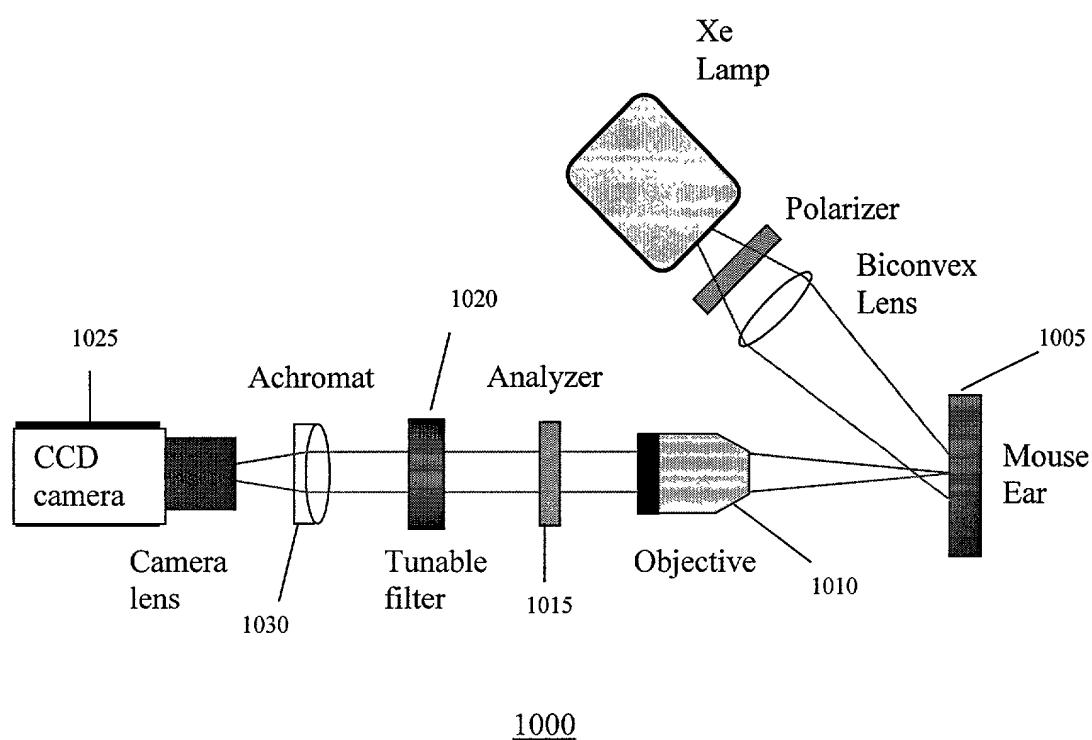
**FIG. 8A**



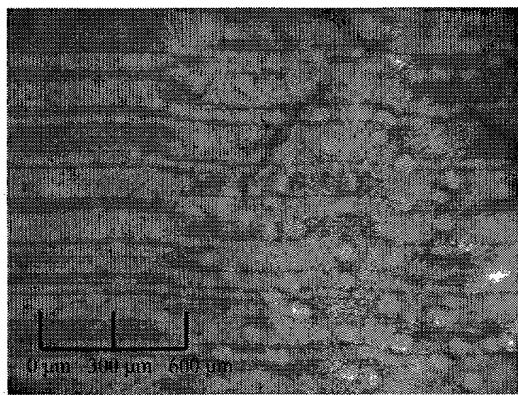
**FIG. 8B**



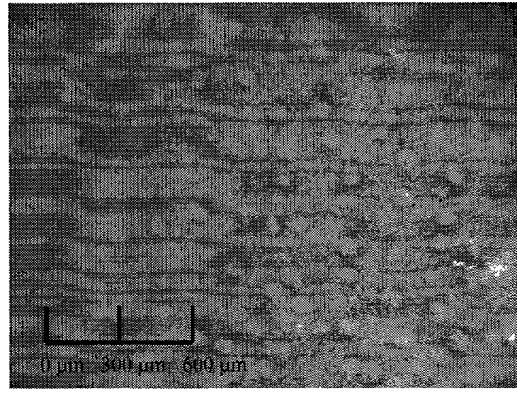
**FIG. 9**



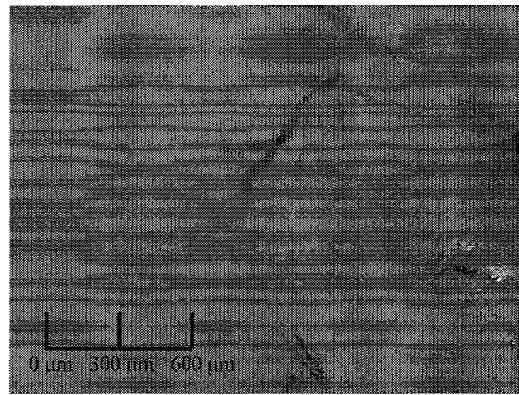
**FIG. 10**



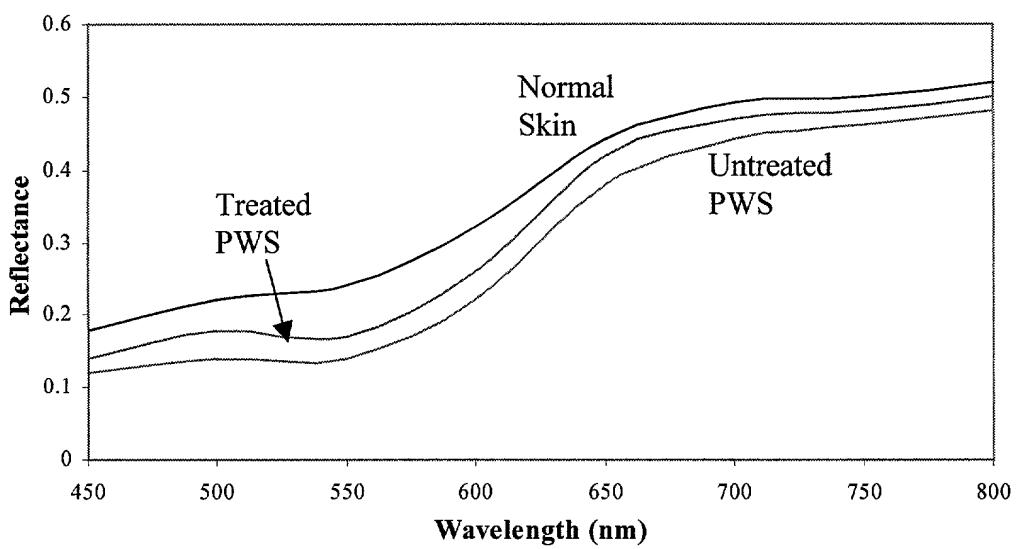
**FIG. 11A**



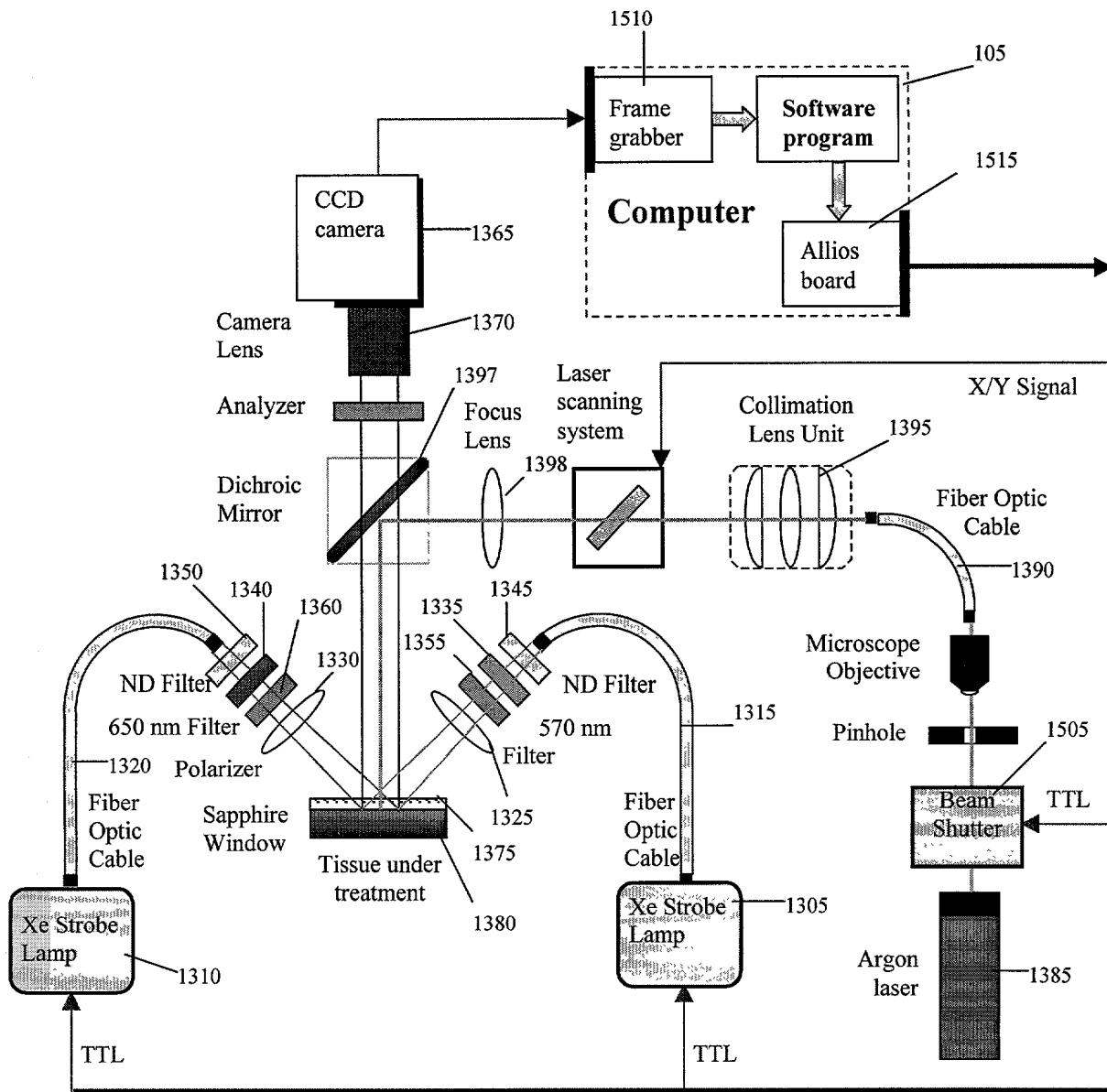
**FIG. 11B**



**FIG. 11C**

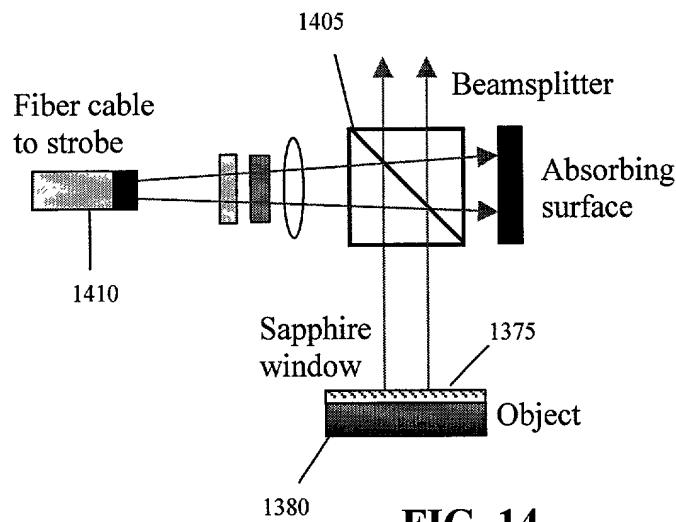


**FIG. 12**

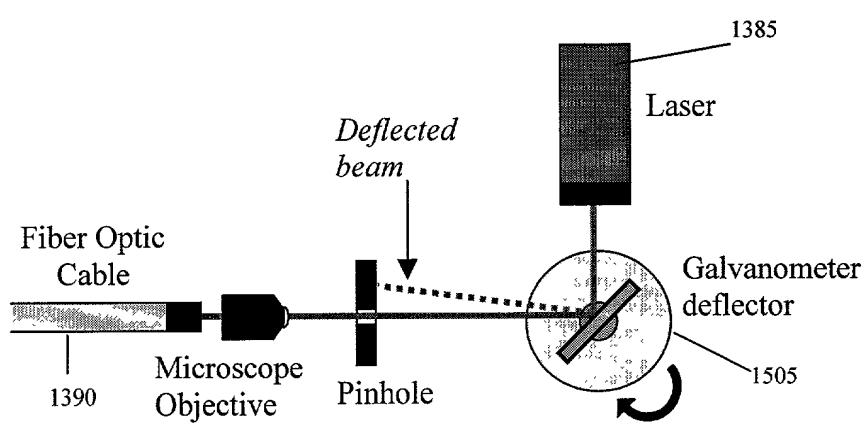


1300

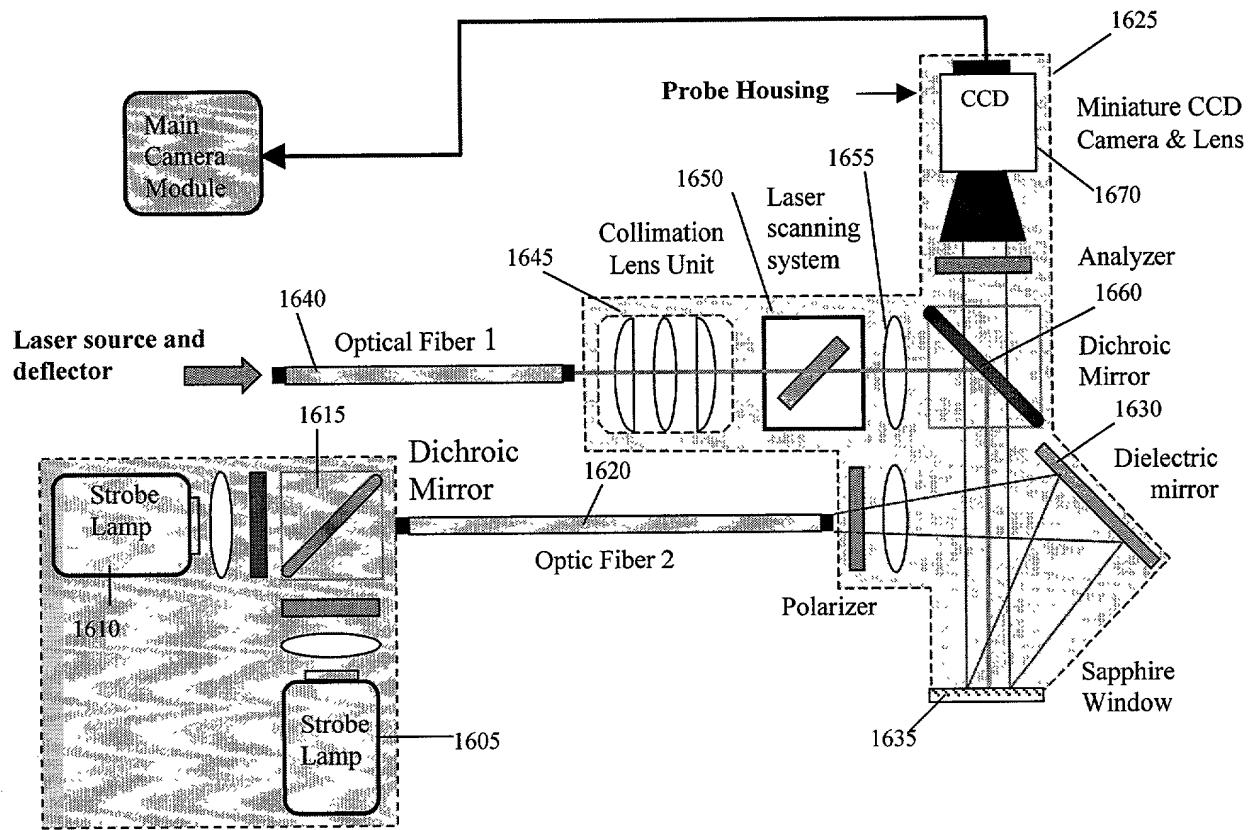
**FIG. 13**



**FIG. 14**

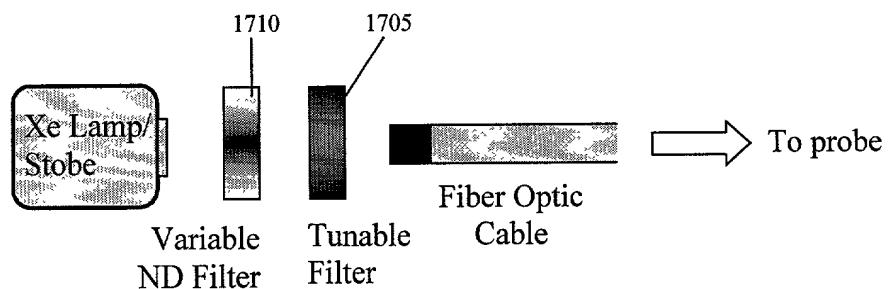


**FIG. 15**

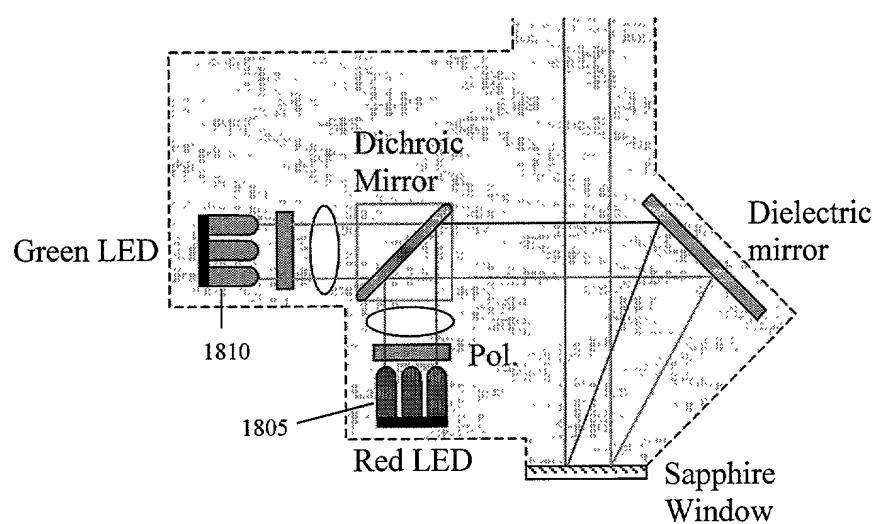


1600

**FIG. 16**

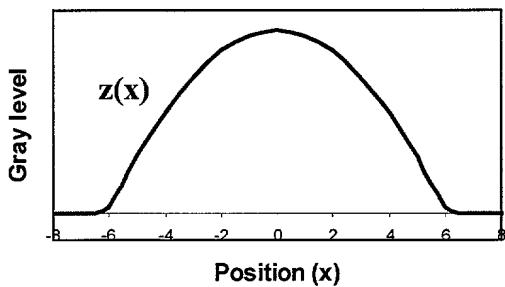


**FIG. 17**



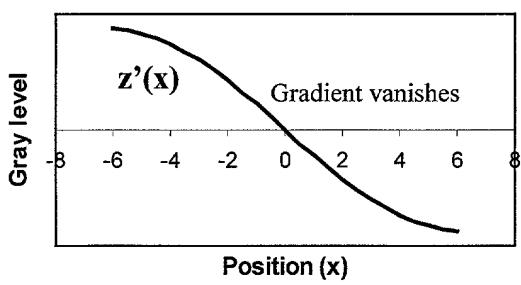
**FIG. 18**

**Parabolic Line Profile**



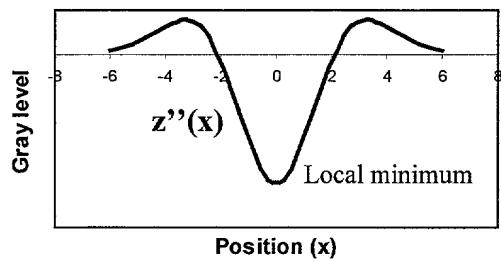
**FIG. 19A**

**First Derivative Profile**

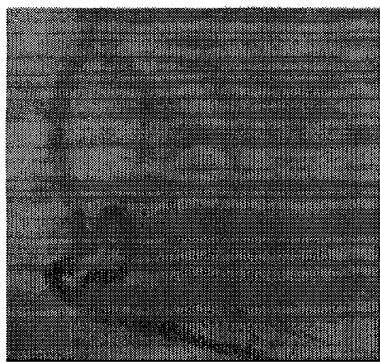


**FIG. 19B**

**Second Derivative Profile**



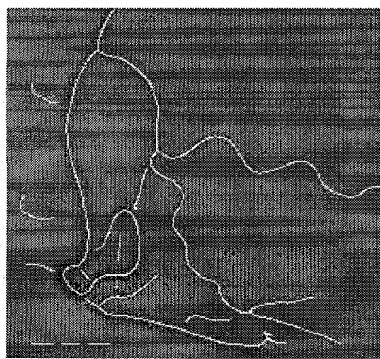
**FIG. 19C**



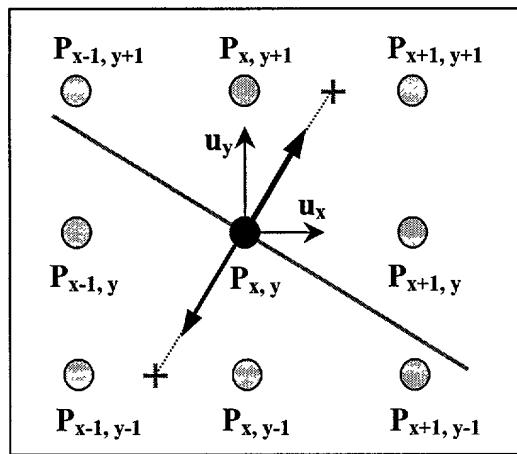
**FIG. 20A**



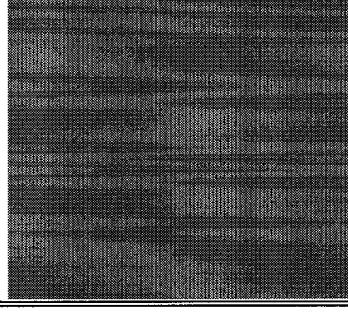
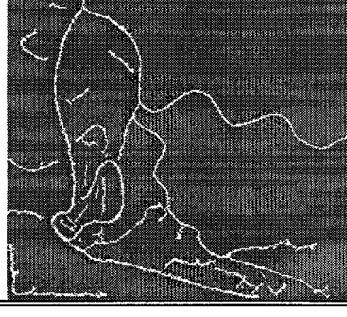
**FIG. 20B**



**FIG. 20C**



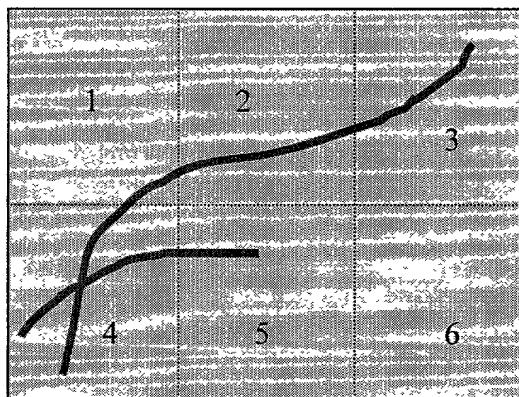
**FIG. 21**

Characteristic of Noise Added	Noise added image	Result of algorithm
<b>No noise added</b>		
$\mu = 0.0$ $\sigma = 0.00008$		
$\mu = 0.0$ $\sigma = 0.0002$		
<b>Histogram rescaled to reduce contrast</b>		

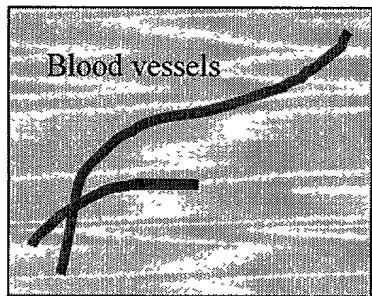
**FIG. 22**

No.	Process	Time (sec)
1.	Direct Convolution: $\sigma = 3.0$	3.9
2a.	Recursive Filtering: $\sigma = 3.0$ $4^{th}$ order IIR filter	3.3
2b.	$3^{rd}$ order IIR filter	3.0

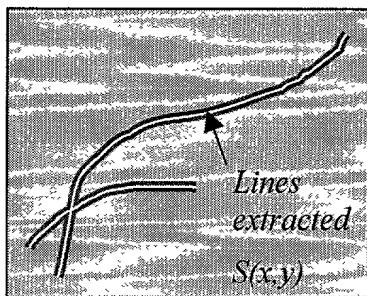
**FIG. 23**



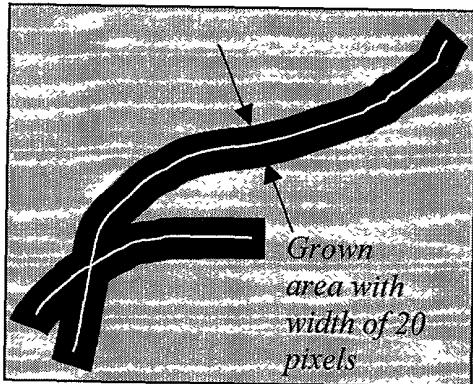
**FIG. 24A**



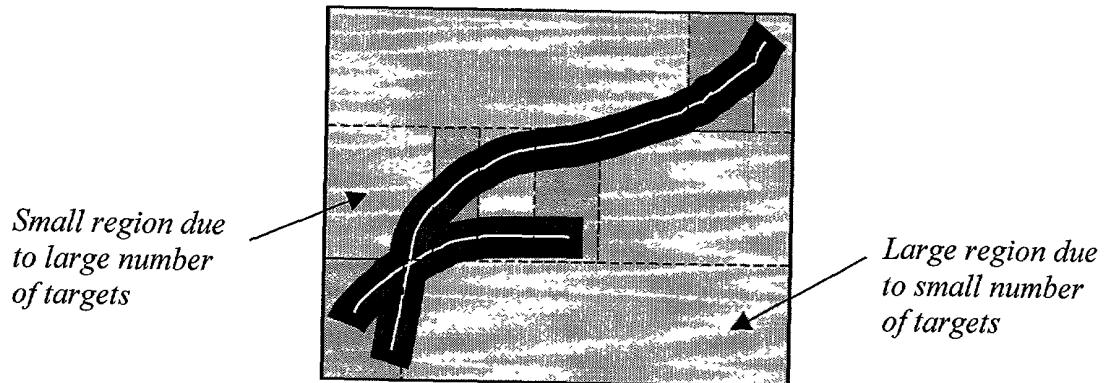
**FIG. 24B**



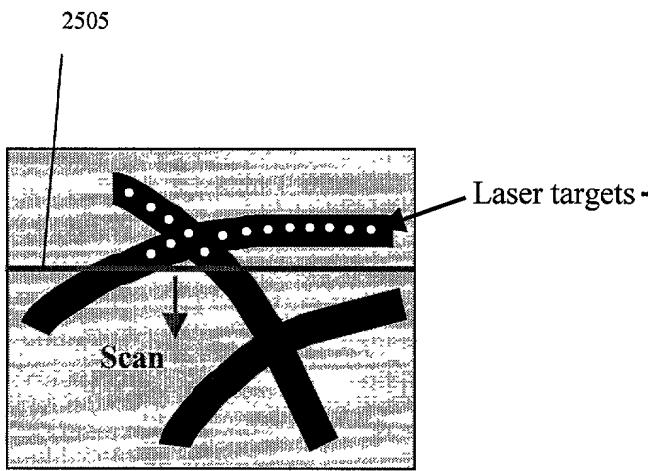
**FIG. 24C**



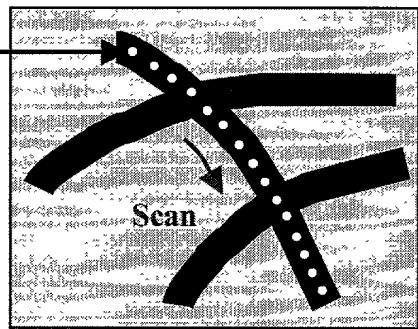
**FIG. 24D**



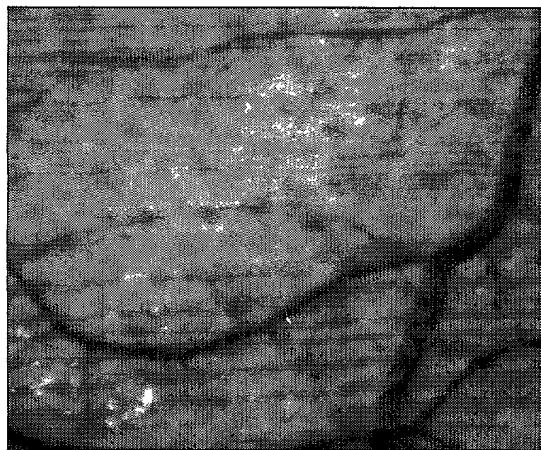
**FIG. 24E**



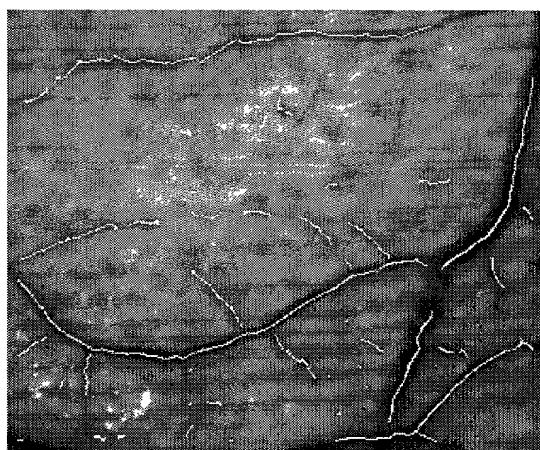
**FIG. 25A**



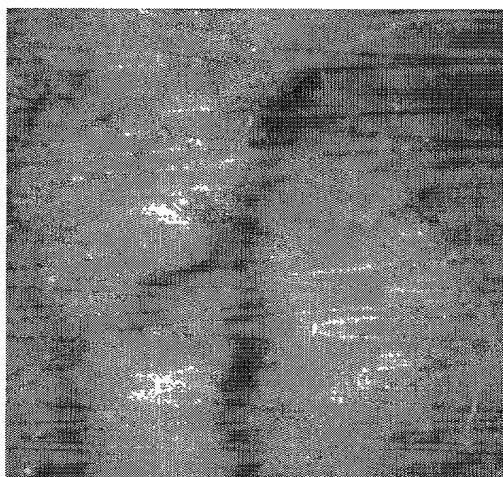
**FIG. 25B**



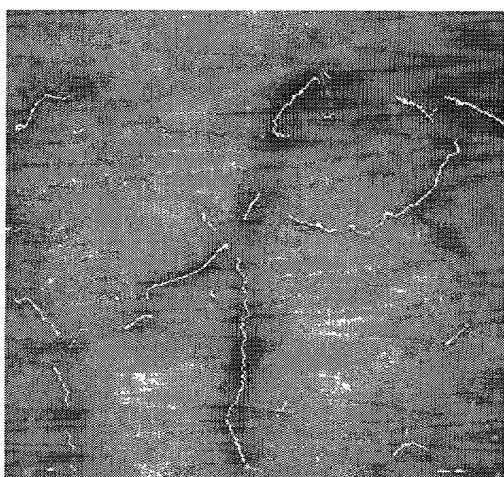
**FIG. 26A**



**FIG. 26B**



**FIG. 27A**

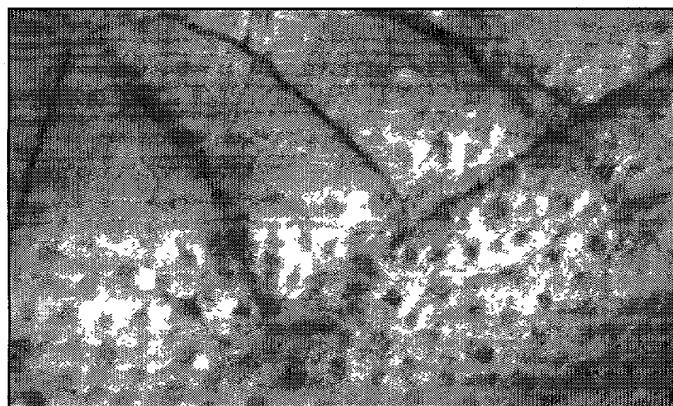


**FIG. 27B**

Laser	Coherent Innova 100 CW Argon Laser
Wavelength	514 nm
Beam diameter	750 $\mu$ m
Power	1 watt
Pulse width	80 ms (CW laser pulsed mechanically)
Fluence	$18.1 \times 10^4$ J/m <sup>2</sup>

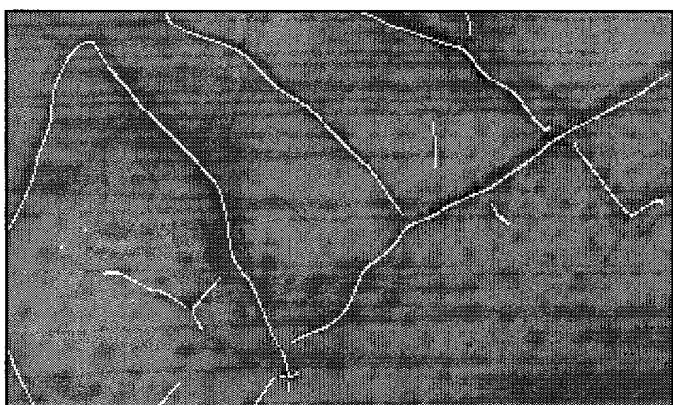
*Treatment laser parameters*

**FIG. 28**



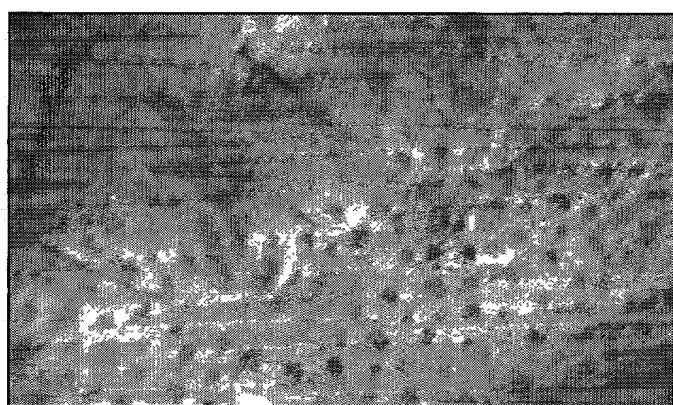
*Blood vessels before treatment  
(illumination at 577 nm).*

**FIG. 29A**



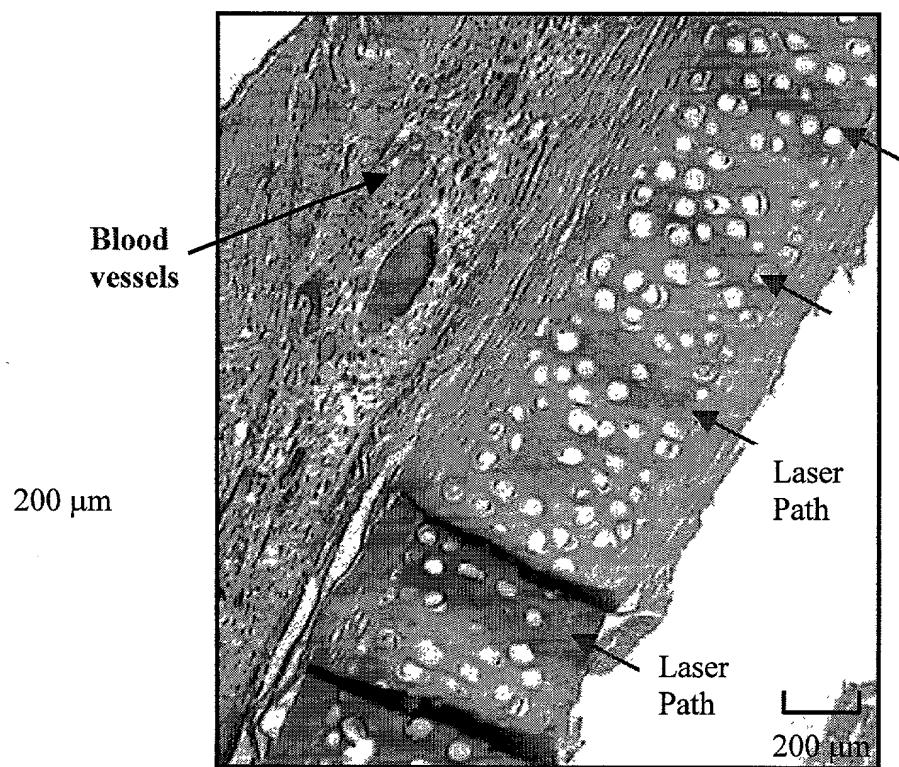
*Targets identified by the Smart  
Scalpel.*

**FIG. 29B**



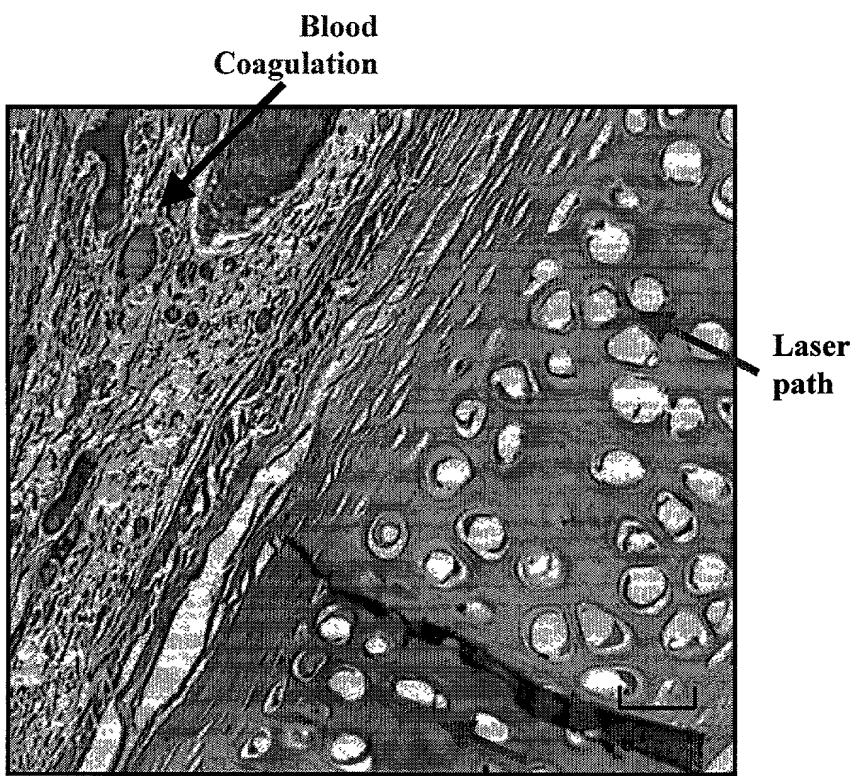
*Blood vessels immediately after  
treatment.*

**FIG. 29C**



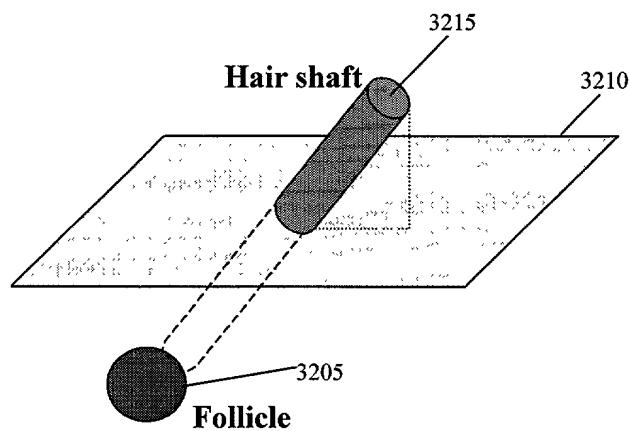
*Histology results*

**FIG. 30**

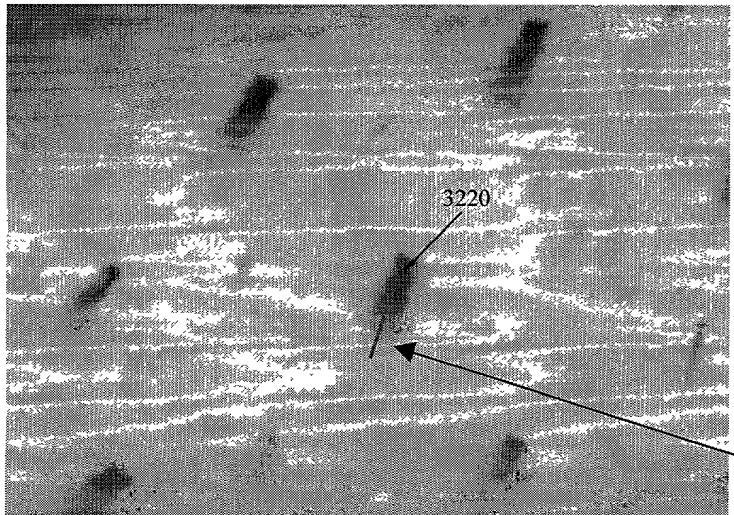


*Close-up view showing coagulated blood vessels*

**FIG. 31**

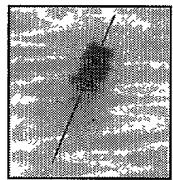


**FIG. 32A**

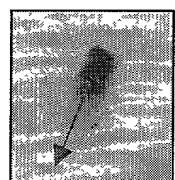


**FIG. 32B**

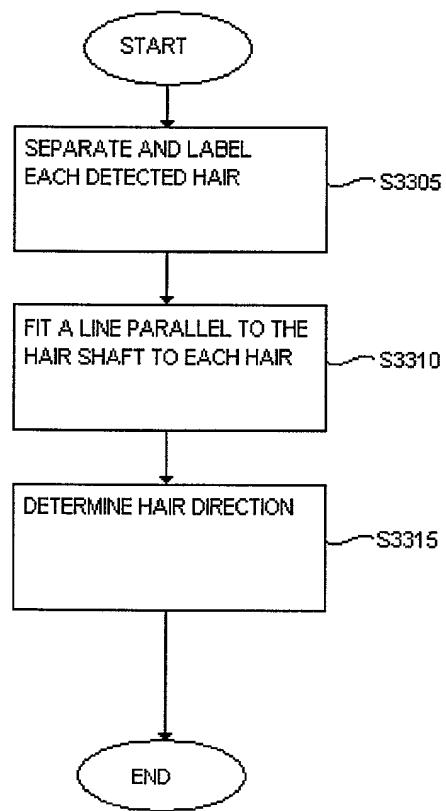
Hair follicle  
beneath the skin  
can lie anywhere  
along this red line.



**FIG. 32C**



**FIG. 32D**



3300

FIG. 33